REPORT TO CANMET

ON

GEOLOGICAL SERVICES

As Supplied to
The Cape Breton Coal
Research Laboratory

DSS File No. 039SQ.23440-0-9189
CONTRACT NO. 23440-0-9189/01-SQ

Submitted to:

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MICROMEDIA

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28pp

92-06291/

ABSTRACT

A geological data base for the three working collieries of the Cape Breton Development Corporation (C.B.D.C.) has been developed for the Cape Breton Coal Research Laboratory (C.B.C.R.L.). Geological plans acquired from C.B.D.C. and representative cross-sections drawn from information on these plans were put on computer using the C.A.D. System. Copies of other pertinent geologic information have also been acquired from C.B.D.C. for C.B.C.R.L. such as coal thickness isopach plans and borehole logs.

Geological information was supplied for several C.B.C.R.L. projects:

1) Cable sling trials;
2) Lingan #1 slope borehole;
3) Golder Associates' outburst contract; and
4) Subsidence in the Sydney coalfield.

ABSTRACT

Une base de donnee de geologie, concernant les trois houilleres en exploitation par La Societe de Developpement du Cap-Breton (C.B.D.C.) a ete developpee pour Les Laboratoires de Recherche sur Charbon du Centre Canadien de la Technologie des Mineraux et de l'Energie (C.B.C.R.L.).

Des plans geologiques, acquis de C.B.D.C., et des coupes representatives, dessinees a partir de l'information obtenue de ces plans ont ete rassemblees sur ordinateur D.A.O. Des copies d'autres informations geologiques pertinentes ont egalement ete acquises de C.B.D.C. pour C.B.C.R.L., telles que des cartes d'epaisseur de charbon "isopah" et des agendas de forages.

Une information geologique a ete fournie pour plusieurs projects de C.B.C.R.L.:

1) Les essais de bretelles de cable;
2) Le tunnel descendant du forage #1 a Lingan;
3) Le contract sur les eclatements de "Golder Associates";
4) L'affaissement du terrain houiller de Sydney.

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1. INTRODUCTION

I was commissioned by the Cape Breton Coal Research Laboratory to provide geological services, in particular, plans and cross-sections for the underground coal mine workings at each of the Cape Breton Development Corporation active collieries (Lingan, Phalen and Prince). This work involved getting Cape Breton Development Corporation's geology plans from the three working collieries and having them put on computer by Vaughan Engineering and the staff at the Cape Breton Coal Research Laboratory. These plans were then used to develop geologic cross-sections in the colliery areas. The geologic plans and sections can now be used in full or part by C.B.C.R.L. staff to complement their work. They should be updated on a monthly basis using C.B.D.C. information.

Also retrieved from the Mining Engineering Department of the Cape Breton Development Corporation were bathymetric plans, plans showing coal seam thickness, geologic prognosis, and most relevant borehole logs. The borehole logs have been filed at C.B.C.R.L. under the colliery to which they pertain.

During the course of the project, I acted as a geology resource person and helped with several projects: drew geological sections for reports; logged rock core; supplied geologic data for the rock outburst contract; and interpreted geological roadway mappings.

2. GEOLOGICAL PLANS/SECTIONS

The Cape Breton Development Corporation has a multitude of geologic information collected over the years on the Sydney coalfield. Most of this information has either been hand drafted or sketched. My job was to retrieve as much information as possible that was relevant to the work being carried out at

C.B.C.R.L. and have at least the working colliery geology put on computer using the C.A.D. System. The reason for this was to make the geologic information readily available to whomever required it, and to make the representation and updating of strategraphic information simpler. Until recently, geology was often plotted on outdated mine plans.

With the permission of C.B.D.C. and their geological staff, I received computer disks with their updated mine plans, and obtained copies of geological plans for each colliery along with coal seam thickness isopach maps, bathymetric maps, wall prognosis profiles and most relevant borehole logs. Vaughan Engineering was contracted to digitize the information from the geological plans and, using C.A.D., put it on the mine plan disks for each working colliery. Both the C.B.D.C. and N.S. grids were put on the plans so that each could be used in conjunction with C.B.D.C. and N.S.D.N.R. and Government of Canada geological plans.

Several cross-sections were developed using the data collected. Two of these were through the Lingan and Phalen Collieries and two were through Prince Colliery. These were also digitized using the C.A.D. System and cross-referenced to the geology plans.

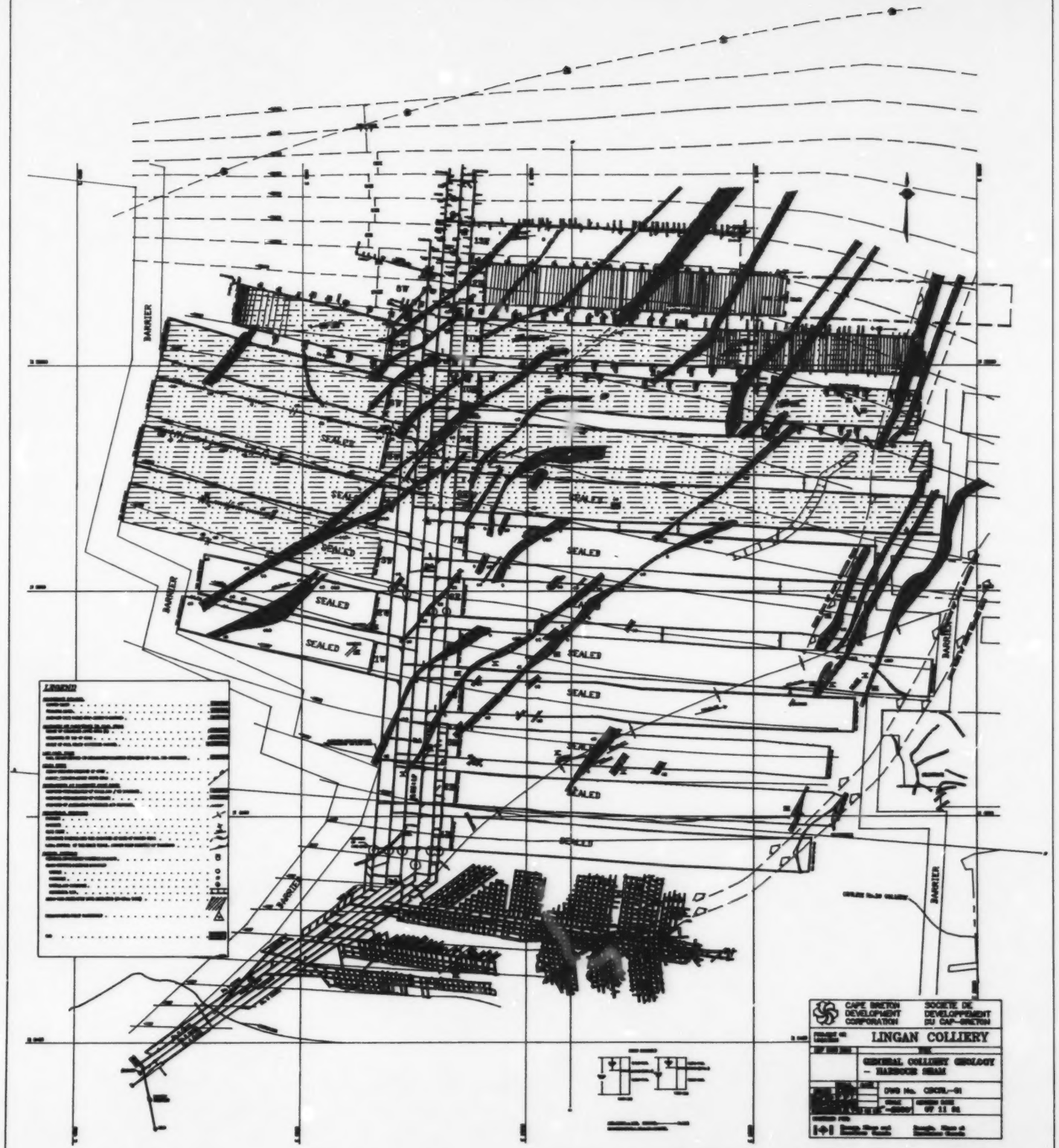
2.1 The geology plans retrieved from C.B.D.C. and put on computer are as follows:

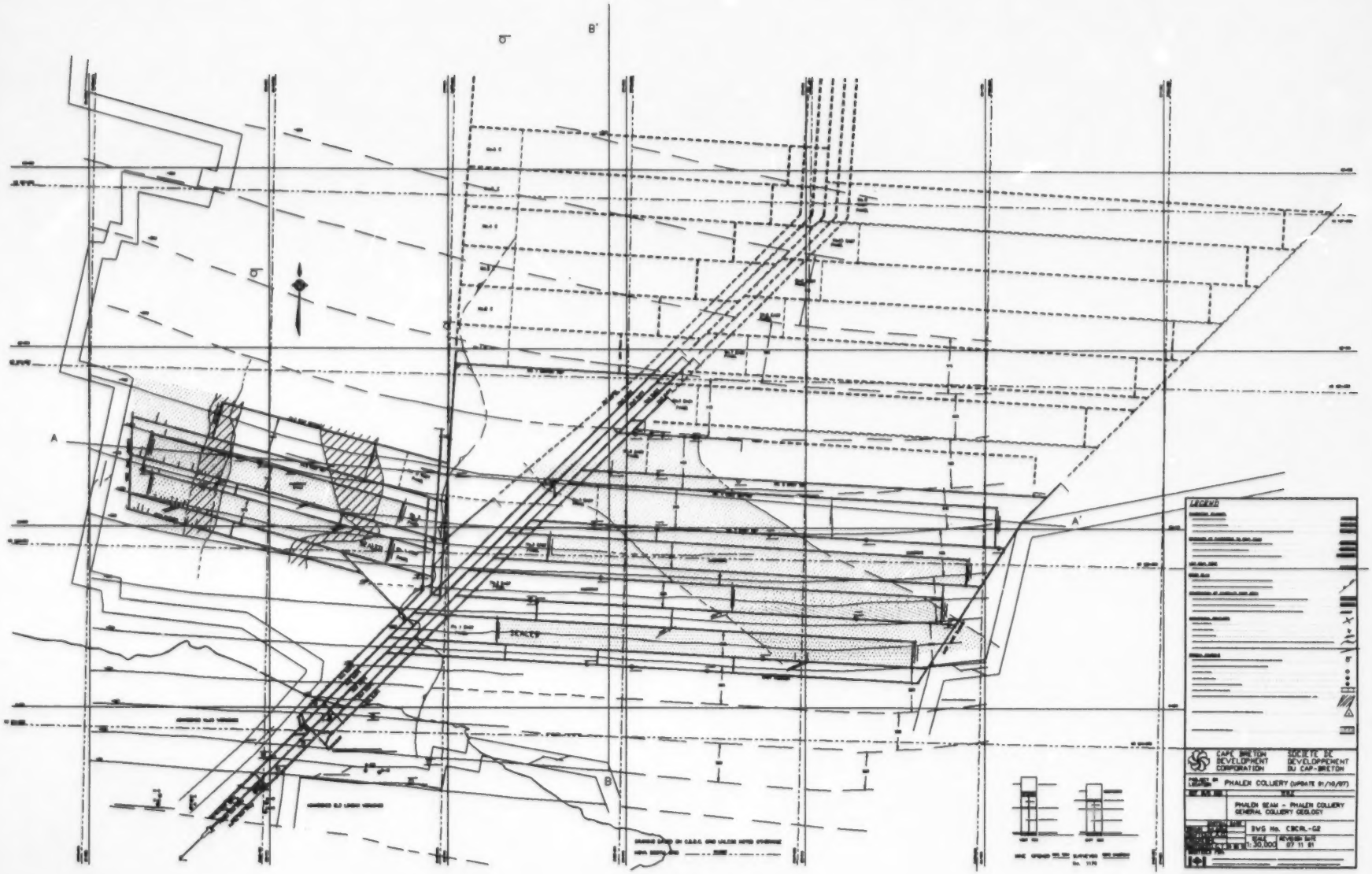
a) Harbour seam-Lingan Colliery, General Colliery Geology Scale 1" = 1,000' CBCRL G-1

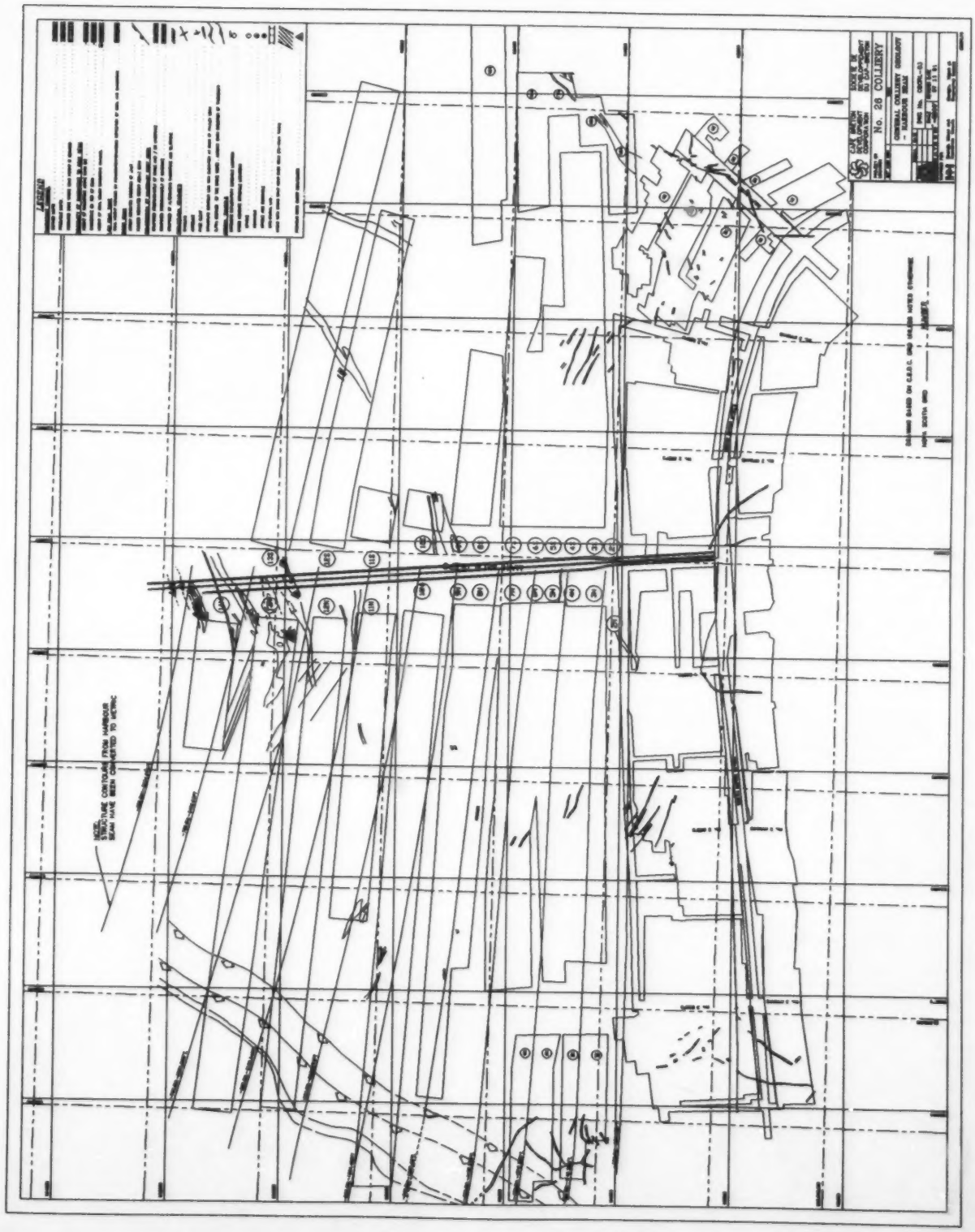
b) Phalen Seam-Phalen Colliery, General Colliery Geology Scale 1:10,000 CBCRL G-2

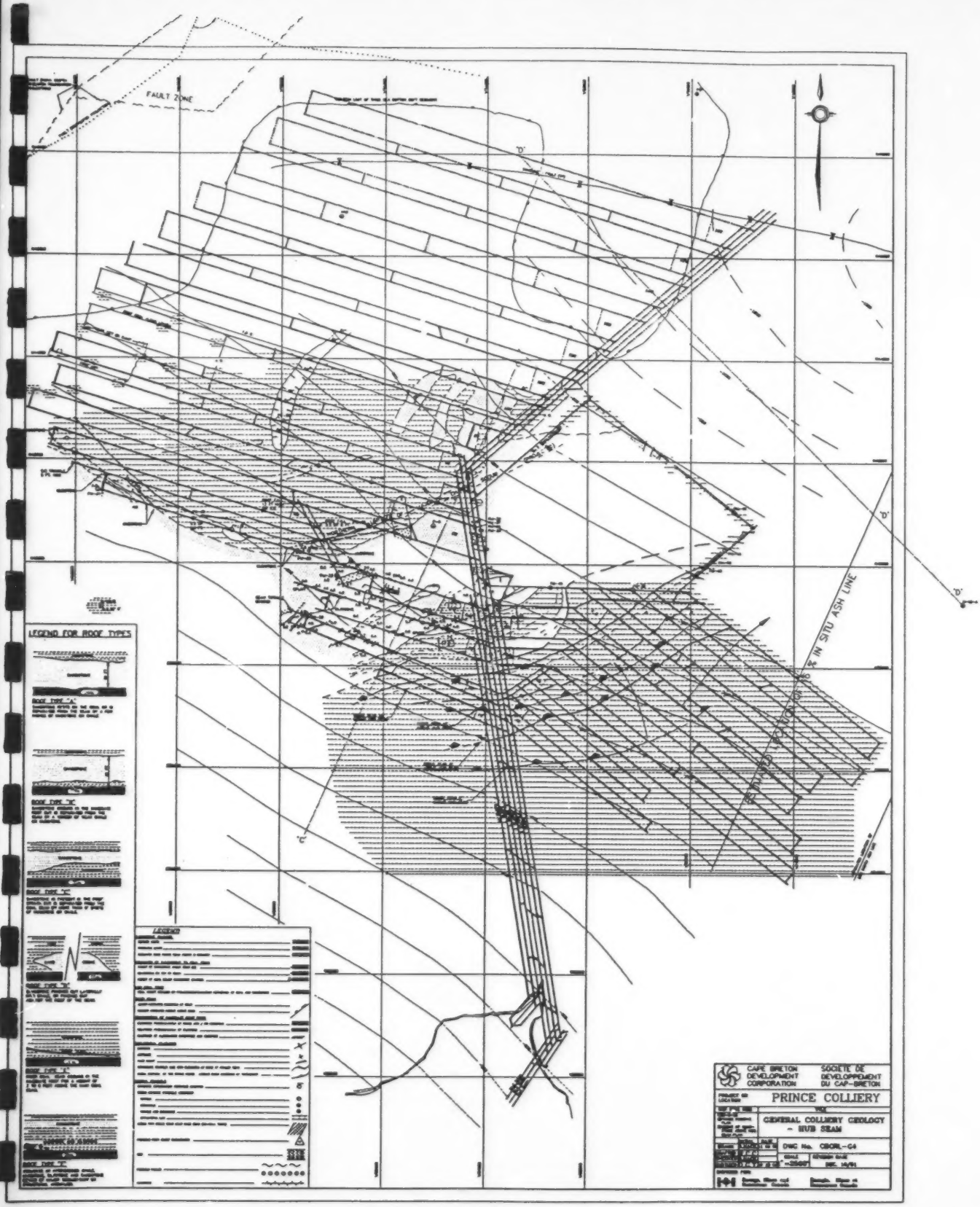
c) No. 26 Colliery, General Colliery Geology Scale 1" = 1,000' CBCRL G-3

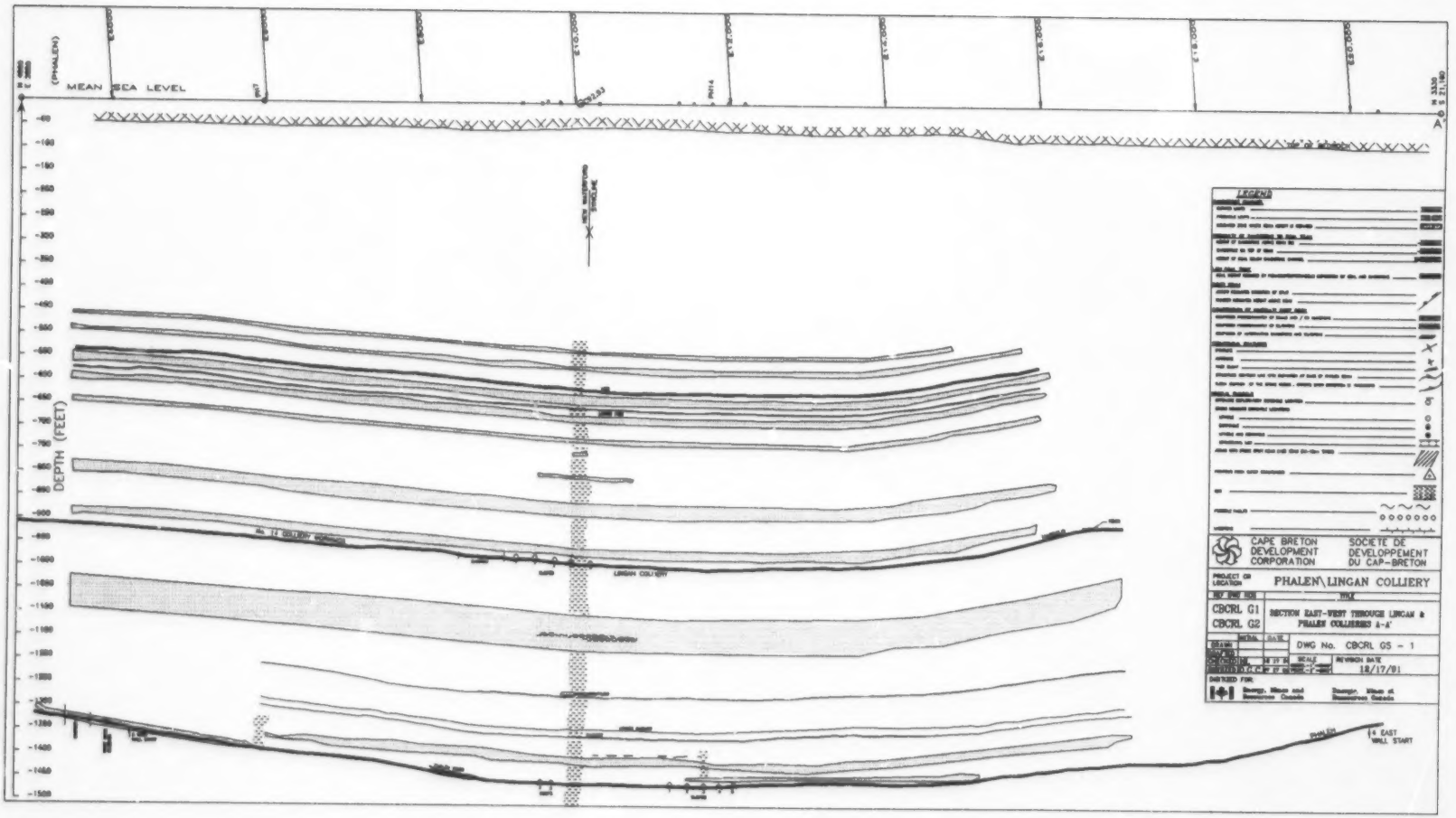
d) Hub Seam-Prince Colliery, General Colliery Geology Scale 1"=1,000' CBCRL G-4

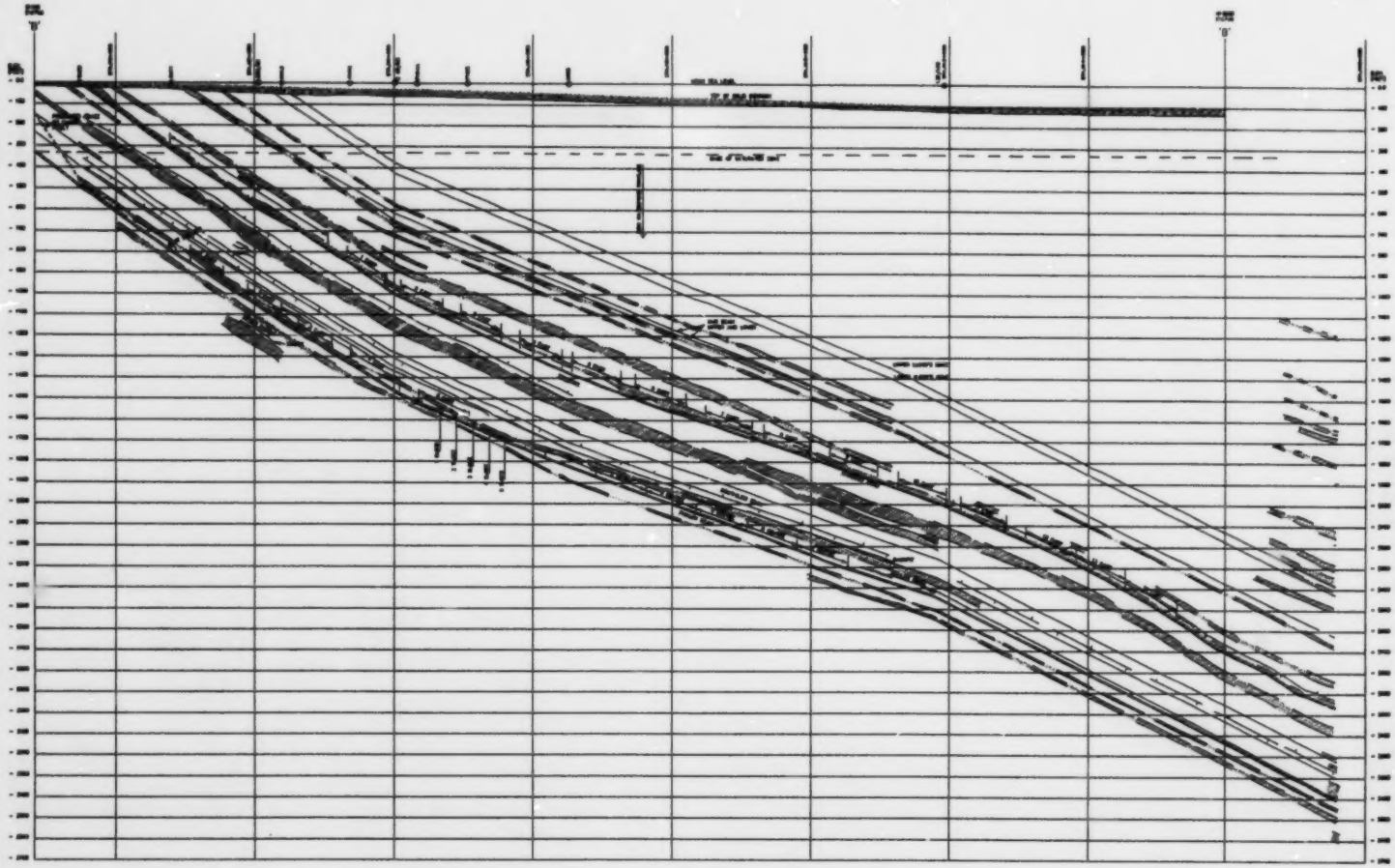

BARRIER
SEALED
LEGEND
CAPE BRETON DEVELOPMENT CORPORATION
SOCIETE DE DEVELOPPEMENT DU CAP-BRETON
LINGAN COLLIERY
GENERAL COLLIERY GEOLOGY - HARBOUR SEAM


B'
A
A'
B
LEGEND
CAPE BRETON DEVELOPMENT CORPORATION
SOCIETE DE DEVELOPPEMENT DU CAP-BRETON
PHALEN COLLIERY (UPDATE 91/10/07)
PHALEN SEAM - PHALEN COLLIERY
GENERAL COLLIERY GEOLOGY
DWG No. CBCRL-G2
SCALE 1:30,000
REVISION DATE 91 11 01


No. 28 COLLIERY


FAULT ZONE
D'
D
IN SITU ASH LINE
LEGEND FOR ROOF TYPES
LEGEND
CAPE BRETON DEVELOPMENT CORPORATION
SOCIETE DE DEVELOPPEMENT DU CAP-BRETON
PRINCE COLLIERY
GENERAL COLLIERY GEOLOGY - HUB SEAM
DWG No. CBDRL-G4


(PHALEN)
MEAN SEA LEVEL
DEPTH (FEET)
A
A'
LEGEND
CAPE BRETON DEVELOPMENT CORPORATION
SOCIETE DE DEVELOPPEMENT DU CAP-BRETON
PROJECT OR LOCATION
PHALEN\LINGAN COLLIERY
CBCRL G1
CBCRL G2
SECTION EAST-WEST THROUGH LINGAN & PHALEN COLLIERIES A-A'
DWG No. CBCRL GS - 1
SCALE
REVISION DATE
12/17/91
DRAWN FOR:
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada



LEGEND

CAPE BRETON DEVELOPMENT CORPORATION

SOCIÉTÉ DE DÉVELOPPEMENT DU CAP-BRETON

PROJECT OR LOCATION: LINGAN / PHALEN COLLIERIES

TITLE: SECTION 'B' - 'B' NORTH - SOUTH

DWG No. CBCRL GS-2

SCALE

REVISION DATE 12/10/91

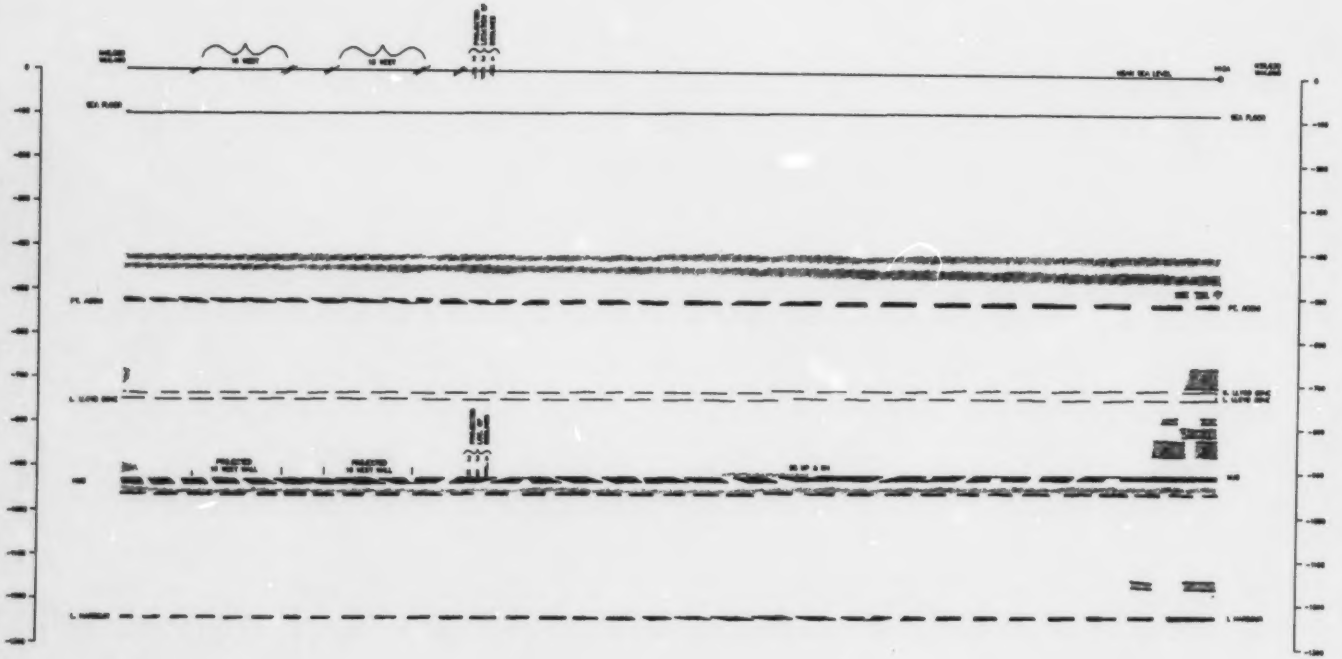
DRAWN

DESIGNED

CHECKED

APPROVED

DIGITIZED FOR: Energy, Mines and Resources Canada



LEGEND

CAPE BRETON DEVELOPMENT CORPORATION

SOCIÉTÉ DE DEVELOPPEMENT DU CAP-BRETON

PROJECT OR LOCATION: PRINCE COLLIERY

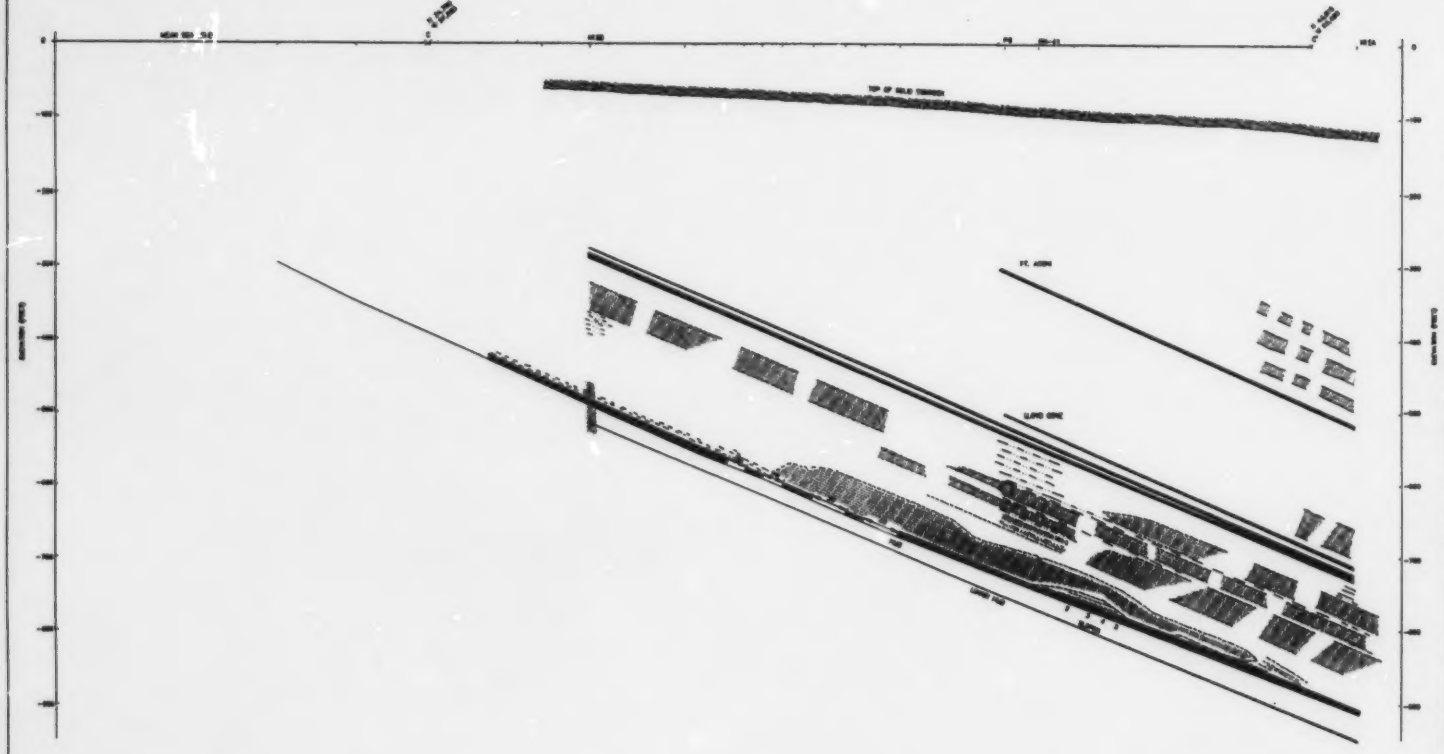
EAST - WEST
SECTION D - D; MIDPOINT H12-P5 TO H12A

DWG No. CBCRL GS - 3

SCALE

REVISION DATE 12/17/81

DRAWN FOR:



LEGEND

CAPE BRETON DEVELOPMENT CORPORATION

SOCIETE DE DEVELOPPEMENT DU CAP-BRETON

PROJECT OR LOCATION: PRINCE COLLIERY

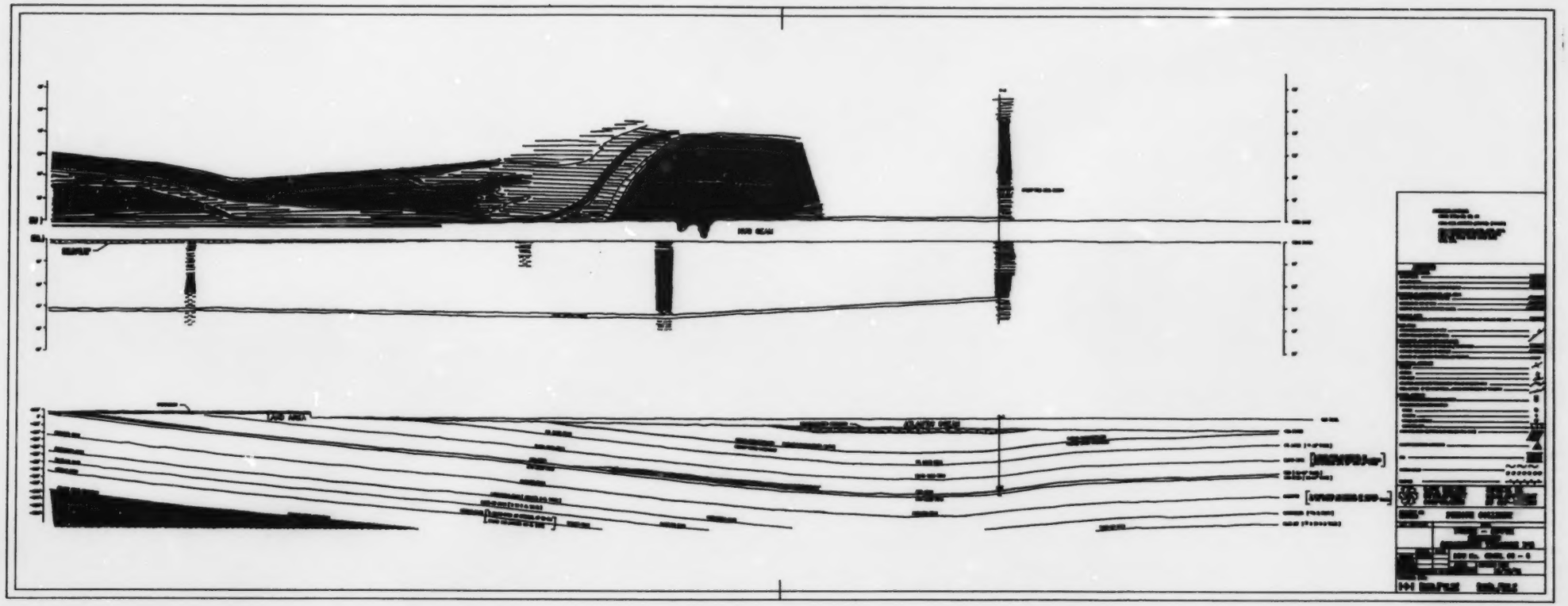
TITLE: SECTION 'C' - 'C'

DWG No. CBCRL GS - 4

SCALE

REVISION DATE: 12/17/91

DIGITIZED FOR:



2.2 The geologic sections constructed using data from the geological information received from C.B.D.C. and digitized using the C.A.D. System are as follows:

a) East-West through Lingan & Phalen Collieries CBCRL GS-1

b) North-South through Lingan & Phalen Collieries CBCRL GS-2

c) East-West offshore through Prince Colliery CBCRL GS-3

d) North-South offshore through Prince Colliery CBCRL GS-4

e) North-South shoreline through P5 in Prince Colliery CBCRL GS-5

3. PROJECT SPECIFIC DATA

3.1 *Cable Sling Trials*

Geological sections were prepared for the locations of the cable sling trials in Phalen Colliery on 2-West Top and 2-West Bottom Levels. [see figure 1] A geological assessment was made regarding the presence and location of sandstone within the trial area.

3.2 *Lingan #1 Slope Borehole*

Geological data was supplied for the Lingan #1 slope borehole, and was used in the preparation of the cross-section [Figure 3 in the report presented at the 10th Internal Conference on Ground Control Mining] [see figure 2]

3.3 *Outburst Contract*

Geological plans were supplied to Golder Associates for their evaluation of rock/gas outburst potential at Lingan Colliery : CBCRL-G1 Geology of the Harbour seam at Lingan Colliery; LIN-13E-13 plan of proposed probe drilling in 13E bottom-Lingan Colliery; 83-G-7 geology plan of No. 26 and Lingan Collieries; geology plan of No. 26 Colliery roof geology in deeps and development headings 12N to 15N; Bathymetric plan - Point Aconi to Table Head, Glace Bay; Coal height isopach plan of Lingan Colliery. Lingan and Phalen Borehole logs were also supplied to Golder Associates. The boreholes drilled for the Insitu stress study of Lingan Colliery were logged and are appended. [see Appendix A7]

4. 4.1 *Rock Outburst Study - Lingan Colliery*

An up-to-date file has been kept on the outburst monitoring program presently being carried out by the Cape Breton Development Corporation in the 13E section of Lingan Colliery.

4.2 *Subsidence Data*

Mr. Lawrence (Shorty) Long was contacted in reference to subsidence in the Town of Glace Bay. He supplied several profiles prepared over a period of years of the change in elevations on some streets in Glace Bay. The most interesting of these was

the profile of Main Street, which covered the period 1902 to 1949 from the railway crossing to Wallace's Road. This profile shows definite areas of subsidence. It is underlain by the Harbour seam approximately 120' below surface. This plan is not appended but can be found in the C.B.C.R.L. Library. It will be put in the C.A.D. System in the near future. Other plans on subsidence received from Mr. Long were 1) Glace Bay General Hospital and adjacent area subsidence (elevations and plans 1926) and 2) C.B.D.C.'s shop area subsidence datum.

4.3 *Geology*

A geology dictionary was secured for the use of all C.B.C.R.L. employees and is situated in B. Gallant's office.

The Phalen geology roadway mappings were interpreted for some C.B.C.R.L. staff, geologic terms defined and rock mass classification systems explained.

A list of file references for geological reports and borehole logs is given in Appendix "A".

5. SUMMARY

Geological plans were acquired from C.B.D.C. for their three working collieries. From these plans representative geological cross-sections were developed - both the plans and cross-sections were put on computer using the C.A.D. System. These plans and cross-sections now form a geological base to be used by C.B.C.R.L. and C.B.D.C. staff in their various projects. To date,

only the basic geological information is included in this data base. Coal thickness isopach plans, sulphur and ash concentration isopach plans and bathymetric charts would be future considerations for C.A.D. adaption.

Geological information was supplied for several C.B.C.R.L. reports:

1) Cable sling trials;
2) Lingan #1 slope borehole; and
3) Outburst contract.

Files have been kept on the rock outburst study at Lingan Colliery being carried out by C.B.D.C. and for logs of boreholes drilled in each of the working collieries.

Historical data was collected on subsidence in the Town of Glace Bay as measured by the Dominion Coal Company. This will be used as part of an overall study of subsidence in the Sydney coal field.

The geological plans should be updated on a monthly basis using C.B.D.C. information and the cross-sections should be revised as new information becomes available.

6. ACKNOWLEDGEMENTS

I would like to thank the Cape Breton Development Corporation and, in particular, the Geology Department, for their plans, their help and expertise, and their patience during the course of this project.

The assistance of Mr. Dan Chipman of the Cape Breton Coal Research Laboratory and Mr. Doug Thomas of Vaughan Engineering is also acknowledged and much appreciated.

The help of Mr. Lawrence (Shorty) Long in obtaining subsidence information is gratefully acknowledged.

APPENDIX "A"

A. Reference information excluding the geology plans already attached in No. 2.

A.1 Colliery overviews - courtesy of C.B.D.C.

A.2 *Lingan*

(1) LIN-13E-3 plan at proposed probe hole drilling 13E bottom 1"=200'

(2) 12E wall prognosis 1"=100'

A.3 *Phalen*

(1) Colliery plan with Lingan workings superimposed 1:5000

(2) Geology plan and eastside profile of roof strata 1:5000

(3) Geology plan and projected profile of roof geology along 5E bottom 1:5000

(4) 84-G-3 Structure contour and gradient 1:10,000

(5) Isopach - total seam thickness 1:10,000

(6) Cross-section - 1-centre top level 1:100

(7) Isopach - main seam thickness 1:10,000

(8) Isopach - stone wedge thickness 1:5000

(9) Mine plan - mapping location 1:5000

(10) Boreholes - 4E top level 1:5000

(11) Prognosis - 1 west wall 1:2000

(12) Prognosis - 2 west wall 1:2000

(13) Prognosis - 3 west wall 1:2000

(14) Boreholes - 2E top (C136, C137, & C138) 1:3000

A.4 *Prince*

(1) Geological section - shoreline north through P5 1"=600'

(2) Geology plan - floor geology 1"=500'

(3) 626R isopach - depths to top of rockhead 1"=400' (2 sheets)

(4) 627R Isopach - water depths 1"=400' (2 sheets)

(5) Isopach - Hubb seam thickness 1"=500'

(6) Hub-Prin-3L Isopach - partial plan showing total seam thickness 1"=100'

(7) Isopach - height of base of sandstone above hub seam 1"=500'

(8) Isopach - thickness of sandstone above hub seam 1"=500'

(9) Hub-Prin-4T Isopach - height of top of sandstone above hub seam 1"=500'

(10) Prince Colliery Resource Block 1"=1000'

(11) Prognosis - 8 W wall 1"=200'

(12) Prognosis - 9 W wall 1"=200'

A.5 *No. 26*

(1) 83-G-7 Geology plan - No. 26 & Lingan 1"=1000'

(2) Geology plan No. 26 1"=500'

(3) Isopach - harbour seam thickness No's. 12, 14, 26 & Lingan Collieries 1"=1000'

(4) Geology plan No. 26 roof geology in deeps and headings 12 N3 12 S to 15 N 1"=100'

A.6 *Other*

(1) Bathymetric plan Point Aconi to Table Head 1:25000

(2) 486-J profile west Main Street, Glace Bay Scale 40'x4'

A.7 *Borehole Logs* (1) Logs LC-4S-1 to 4 are attached

Note: All numbers preceding plans refer to C.B.D.C. filing system.

BOREHOLE LC 4S-1

Depth (ft)	Thickness (ft)	Description
0 - 8'	Missing	
8' - 12'6"	4'6"	Siltstone - dark grey; fine grained, very slightly micaceous; 12'2"-12'3" - disseminated pyrite layer; hard. Sharp contact.
12'6" - 13'1"	7"	Sandstone - dark grey; fine grained micaceous; thinly bedded, breaks easily along bedding. Gradational contact.
13'1" - 15'1"	2'	Laminate - (60% sandstone/40% siltstone) light to dark grey; fine to medium grained, highly micaceous; breaks easily along bedding. Gradational contact.
15'1" - 16'	11"	Laminate - (80% siltstone/20% sandstone) light to dark grey; fine grained, slightly micaceous; thinly bedded; very hard. Sharp contact.
16' - 17'	1'	Siltstone - dark grey; fine grained, slightly micaceous; occasional fossils and coally fragments; very competent; gradational contact.
17' - 24'	7'	Sandstone - medium to dark grey; fine grained, micaceous; occasional pyritic bands; massive; very competent. Gradational contact.
24' - 28'	4'	Sandstone - light to medium grey; medium to fine grained; micaceous; thinly bedded. Gradational contact.
28' - 38'	10'	Sandstone - medium grey; fine grained, slightly micaceous; thickly bedded; 29'-30'8" and 32'-38' - light to medium grey, medium to fine grained thinly bedded; very competent; 36'-37' - cross bedding noted. Sharp contact.
38' - 41'	3'	Siltstone - dark grey; fine grained; slightly micaceous; plant fossils present; massive.

END OF HOLE

BOREHOLE LC 4S-2

Depth (ft)	Thickness (ft)	Description
0 - 11'	11'	Missing.
11' - 12'	1'	Coal. Sharp contact.
12' - 15'	3'	Siltstone - (seatearth?) dark grey; very fine grained; plant fossils present; abundant listric surfaces; slightly calcareous; very hard but weakened by fossils and listric surfaces. Sharp contact.
15' - 40'	25'	Laminate - (80% sandstone/20% siltstone) medium to dark grey; fine to medium grained becoming coarser at 30'; 15'-25' - iron nodules present; 27'9"-40' - unit is highly micaceous, core breaks along mica planes; very competent; 24'10"-27'9" - sample removed.

END OF HOLE

BOREHOLE LC 4S-3

Depth (ft)	Thickness (ft)	Description
0 - 5'	5'	Missing.
5' - 7'4"	2'4"	Mudstone - medium grey; weak; badly fractured. Gradational contact.
7'4" - 9'6"	2'2"	Siltstone - dark grey; fine grained, slightly micaceous; hard; badly fractured. Sharp contact.
9'6" - 14'9"	5'3"	Laminate - (50% sandstone/50% siltstone) light to medium grey; fine to medium grained, micaceous; laminations frequently wavy; plant fossils occasionally present along bedding. Sharp contact.
14'9" - 23'4 1/2"	8'7 1/2"	Siltstone - dark grey; fine grained, micaceous; occasionally interbedded with light grey fine grained sandstone beds. Sharp contact.
23'4 1/2" - 34'11"	11'61/2"	Laminate - (50% sandstone/50% siltstone) light to dark grey; fine to medium grained, 30'2" - sample taken. Sharp contact.
34'11" - 36'6"	1'7"	Sandstone - medium grey; fine grained, micaceous; massive; very competent. Sharp contact.
36'6" - 37'6"	1"	Laminate - (70% sandstone/30% siltstone) light to medium grey; fine to medium grained, micaceous; laminations wavy. Sharp contact.
37'6" - 40'4"	2'10"	Siltstone - dark grey; fine grained, slightly micaceous; massive; strong.

END OF HOLE

BOREHOLE LC 4S-4

Depth (ft)	Thickness (ft)	Description
0 - 7'	7'	Mudstone - medium grey; abundant listric surfaces; occasional pyrite nodules up to 1 cm long; weak; very broken up. Gradational contact.
7' - 11'6"	4'6"	Siltstone - medium to dark grey; fine grained; occasional listric surfaces near contact with mudstone; massive; strong and very competent.
11'6" - 13'	Missing (1 1/2')	
13' - 17'	4'	Siltstone - medium to dark grey; fine grained; contains small wispy sandstone beds; 13'-15'2" - unit is slightly pyritic and micaceous; 16' - ironstone nodules present. Gradational contact.
17' - 39'	22'	Sandstone - light to medium grey; fine - medium grained; laminated (contains up to 10% siltstone); wavy laminations; occasional ironstone nodules throughout; 30'3"-36' - thinly laminated (contains up to 20% siltstone) micaceous and carbonaceous material common along laminations; 36'-39' - thickly laminated; competent. Sharp contact.
39' - 40'9"	1'9"	Siltstone - dark grey; fine grained, very slightly micaceous; massive.

END OF HOLE